

REMARKS

Claims 1–6, 11–12, 14, 21–25, and 30–37 are pending in this application. Claims 8, 9, 13, 27, and 28 are withdrawn. Claims 7, 10, 15–20, 26 and 29 are canceled.

Applicants respectfully disagree with the Examiner's assertion that the claims are directed to functional rather than structural limitations. As pointed out by the Examiner, claim 1 include the phrase "an inlet and outlet which permits inflow and outflow of the target material, wherein the inlet and outlet provide an essentially turbulent vortex flow of the target fluid inside the cavity." As stated in the case law and in the MPEP, "[t]here is nothing inherently wrong with defining some part of an invention in functional terms." MPEP § 2173.05(g). *See also In re Swinehart*, 439 F.2d 210, 169 U.S.P.Q. 226 (CCPA 1971). Moreover, elements that may appear to be functional limitations may also provide structure. *See, e.g., In re Venezia*, 530 F.2d 956, 189 U.S.P.Q. 149 (CCPA 1976); MPEP § 2173.05(g) ("the Court held that limitations such as 'members adapted to be positioned' and 'portions...being resiliently dilatable whereby said housing may be slidably positioned' serve to precisely define present structural attributes of interrelated component parts of the claimed assembly.").

Accordingly, Applicants respectfully submit that it is not warranted by the case law to amend the claims to recite additional structural limitations to define over the cited references. However, in the interest of moving forward in prosecution of this application, Applicants have amended the independent claims to provide additional structure, as is described in more detail below.

Claim 1 has been amended to include the limitations of now canceled claim 10.

Claims 1 and 23 have been amended to state that the irradiation cell comprises an irradiation window which is substantially planar and positioned perpendicularly to the accelerated charged particle beam. Support for these amendments can be found, for example, in Figure 6.

Claims 1 and 23 have been amended to state that the inlet is arranged so that the target fluid inflow is perpendicular to the irradiation window. Support for these amendments can also be found, for example, in Figure 6. Claims 1 and 23 have also been amended to state that the inlet has a central axis generally perpendicular to the substantially planar irradiation window. Support for these amendments can also be found, for example, in Figure 6.

Applicants respectfully submit that these amendments are clearly structural elements directed to the positioning of the inlet and irradiation window.

Rejections under 35 U.S.C. § 102

Claims 1-6, 21, and 22 are rejected under 35 U.S.C. § 102(b) as anticipated by any one of Kiselev et al. (U.S. Patent No. 6,567,492) or Stanton (U.S. Patent No. 3,349,001), or Morelle et al. (IDS), or Shaeffer et al. (ORNL/MIT-258), or Salsig, Jr. (U.S. Patent No. 2,868,987), or under 35 U.S.C. § 102(a) as anticipated by Wieland et al. (U.S. Patent No. 7,200,198).

Claim 32 is rejected as anticipated by one of Kiselev et al., or Shaeffer et al., or under 35 U.S.C. § 102(a) as anticipated by Wieland et al.

Claims 10-12, 14, 23-25, 30, and 33-37 are rejected as anticipated by Salsig, Jr. et al.

As stated above, Claim 1 has been amended to include the limitations of claim 10. Accordingly, claim 1 now states that the inlet is arranged so that the target fluid inflow is directed at an impact point of the accelerated charged particle beam in the irradiation window so that the inflow hits the window head-on with the beam. Independent claim 1 also been amended to state that the inlet is arranged so that the target fluid inflow is perpendicular to the irradiation window and that the inlet has a central axis generally perpendicular to the substantially planar irradiation window.

The Examiner cites Salsig, Jr. et al. against claim 10. Salsig, Jr. et al. describes a U-shaped tube that extends into the cyclotron tank and is bombarded by the beam. The tube is at least partly formed of a material that is transparent or pervious to the beam. (Salsig, Jr., et al. at Col. 3, lines 21–52.) The Examiner states that the junction between the inlet 33 and the cyclotron 12 reads on Applicants' term "irradiation window."

As recited in amended claims 1 and 23, the irradiation window is substantially planar and positioned perpendicularly to the accelerated charged particle beam. Salsig, Jr.'s junction between the inlet 33 and cyclotron 12 is not a substantially planar structure which is positioned perpendicularly to the accelerated charged particle beam. Indeed, the Examiner cites a "junction" which does not appear to have any structure at all, let alone being a substantially planar window as claimed.

Applicants also respectfully submit that Salsig, Jr.'s U-shaped tube is not part of Salsig, Jr.'s irradiation cell having a metallic insert as required by the amended independent claims. Instead, as shown in Salsig, Jr.'s Figures 1 and 4, for example, and as expressly stated in Salsig, Jr.'s specification (col. 3, lines 28–31), the U-shaped tube extends outside of the housing and into the cyclotron tank. Indeed, the portion of the U-shaped tube that is bombarded by the beam is the portion of the tube extending into the cyclotron tank. (See Figure 1 of Salsig, Jr.) The U-shaped tube of Salsig, Jr. is simply not part of a metallic insert as claimed. Moreover, as required by claim 23, the substantially planar irradiation window closes the cavity. Salsig, Jr.'s "junction" is not substantially planar and does not close a cavity.

Additionally, Applicants' amended claims further require that the inlet is arranged so that the target fluid inflow is perpendicular to the irradiation window. This is not taught or suggested by Salsig, Jr. because Salsig does not even have an irradiation window, nor does Salsig, Jr. teach or suggest arrangement of an inlet so

that the target fluid will be perpendicular to a portion of Salsig, Jr.'s structure which is bombarded by a beam.

Because Salsig, Jr. does not have an irradiation window as claimed, Salsig, Jr. also fails to show an inlet having a central axis generally perpendicular to the substantially planar irradiation window.

Accordingly, for the reasons described above, Salsig, Jr.'s junction between the inlet 33 and cyclotron 12 cannot be the claimed metallic insert having an irradiation window and inlet as claimed.

#### The Remaining References

The Kiselev et al., Stanton, Morelle, Shaeffer et al., and Wieland et al. references do not cure these deficiencies.

As can be seen in Figure 1 of Wieland et al., Wieland et al. does not show an inlet arranged so that the target fluid inflow is perpendicular to the irradiation window.

Shaeffer et al. does not describe the location of an irradiation window nor the location of an inlet in relation to an irradiation window. Instead, Shaeffer et al. merely shows in Figure 3, for example, the flow of target water through a production system. There is no teaching or suggestion of the specific placement of an irradiation window or inlet.

Kiselev et al. does not teach or suggest an irradiation window, nor an inlet arranged so that target fluid inflow is perpendicular to the irradiation window.

While Morelle's Figure 1 shows a recirculating target, Morelle does not teach or suggest an irradiation window nor an inlet positioned with the target fluid inflow perpendicular to an irradiation window.

Stanton's Figure 1 shows metal entering a transition column 31 through inlet pipe 35, which flows downward by gravity in the transition column. Stanton states that if the target is a gas, a small membrane or "window" may added to the end of the proton guide tube. However, even if one considers this window to be an "irradiation window," the proton guide tube 19 is positioned towards the bottom of the transition column such that the inlet is positioned with the target fluid inflow perpendicular to the window.

Rejections under 35 U.S.C. § 103(a)

Claims 2-6 and 22 are rejected under 35 U.S.C. § 103(a) as obvious over one of Kiselev et al. or Stanton or Wieland ('198) or Morelle et al. or Scheffer et al. or Salsig, Jr. et al. As each of these rejected claims ultimately depends from independent claims 1 or 23, Applicants respectfully submit that the dependent claims are patentable for at least the reasons already described above for each of the independent claims.

The Commissioner is hereby authorized to charge any additional fees which may be required with respect to this communication, or credit any overpayment, to Deposit Account No. 06-1135.

Respectfully submitted,

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